AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF THE CLAIMS

1. (currently amended) A demand responsive physiological control system for use with a rotary blood pump; said system including a pump controller which is capable of controlling pump speed of said pump; said system further including a physiological controller, and wherein said physiological controller is adapted to analyse input data relating to physiological condition of a user of said pump; and wherein said physiological controller determines appropriate pumping speed and sends a speed control signal to said pump controller to ~~adjacent~~ adjust pump speed; said system further including a physiological state detector which provides said input data indicative of at least one physiological state of said user, in use, to said physiological controller.

2. (original) The system as in claim 1 wherein the physiological state detector includes an accelerometer to sense motion of the user, when in use.

3. (original) The system as in claim 2 wherein the accelerometer senses motion in at least one axis.

4. (original) The system as in claim 3 wherein the accelerometer senses motion in three orthogonal axes.

5. (previously amended) The system as in claim 4, wherein said system includes a pump monitor that detects information relating to voltage and current of the pump and delivers this information to said physiological controller.

6. (original) The system as in claim 5 wherein the pump monitor detects an instantaneous pump impeller speed of the rotary blood pump through measurements.

7. (original) The system as in claim 6 wherein the pump monitor detects non-invasively.

8. (original) The system as in claim 6 wherein said physiological controller uses said information received from the pump monitor to derive mathematically an appropriate pump speed.

9. (original) The system as in claim 8 wherein the physiological controller assesses

flow dynamics and an average flow estimate developed from speed and input power supplied to the pump by the pump controller.

10. (original) The system as in claim 8 wherein the physiological controller mathematically determines a pumping state and if a deleterious state is determined the speed control signal is changed accordingly.

11. (previously amended) The system as in claim 10 wherein the physiological detector includes a means of detecting and quantifying a heart rate of the user, when in use.

12. (original) The system as in claim 11 wherein the physiological detector includes a means of non-invasively detecting and quantifying a heart rate of the user, in use.

13. (previously amended) The system as in claim 12 wherein, the physiological controller can determine a heart rate of the user using power inputted to the pump.

14. (previously amended) The system as in claim 13 wherein the pump is internally implantable within the user.

15. (original) The system as in claim 14 wherein the pump is a ventricle assist device.

16. (previously amended) The system as in claim 14 wherein the pump has a hydrodynamic bearing that produces a relatively flat pump head versus pump flow curve.

17. (previously amended) The system as in claim 16 wherein the physiological controller is capable of manual manipulation by the user.

18. (original) The system as in claim 17 wherein the manual manipulation is within adjustable predefined limits.

19. (previously amended) The system as in claim 18 wherein the physiological controller is adapted for communication with a computer and wherein the physiological controller, is adapted for manipulation by a software user interface.

20. (previously amended) The system as in claim 19 wherein the physiological controller includes an alarm.

21. (original) A process for using physiological demand data to optimize pump speed of a rotary blood pump wherein the process comprises of the following steps: a heart rate of the user is non-invasively determined; a level of physiological exertion of the user is determined through non invasive means; an instantaneous pump speed and input power is used to calculate instantaneous blood flow rate; a pumping state is mathematically determined; the heart rate,

pumping state and level of physical exertion are compared to the blood flow rate; and the pumping speed of the rotary blood pump is changed to appropriately supply the user with the correct blood flow rate.

22. (original) A pump control system for a pump for use in a heart assist device; said system comprising data processing means which receives body motion information and heart rate information thereby to derive a speed control signal for impeller speed of an impeller, of said pump.

23. (original) The system of claim 22 wherein said body, motion information is derived from an accelerometer.

24. (original) The system of claim 23 wherein said accelerometer senses motion in a single axis.

25. (original) The system of claim 23 wherein said accelerometer senses motion in three orthogonal axes.

26. (original) The system of. claim 22 wherein said heart rate information is derived from a non-invasive sensor.

27. (currently amended) The system of claim 26 wherein said heart rate information is derived from voltage and current applied to an electric motor ~~deriving~~ driving said impeller.

28. (original) A physiological demand responsive controller for use with a rotary blood pump implanted within a patient, wherein said controller includes: an accelerometer, which produces an output signal as an analogue of a patient's physical motion; wherein said accelerometer provides an output signal to the circuits of the controller; and wherein said controller controls pumping speed setpoints of blood pump using said output signal.

29. (original) The controller of claim 28 wherein said controller determines pumping speed setpoint by use of a mathematical model or algorithm.

30. (original) The controller of claim 28 wherein said circuits of the controller include at least one conditioning circuit.